

6677/01

Edexcel GCE

Mechanics M1

Advanced/Advanced Subsidiary

Monday 24 May 2010 – Afternoon

Time: 1 hour 30 minutes

Examiner's use only

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Team Leader's use only

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[illegible]

Mathematical Formulae (Pink)

Nil

Candidates may use any calculator allowed by the regulations of the Joint Council for Qualifications. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initials and signature. Check that you have the correct question paper.

Answer ALL the questions.

You must write your answer to each question in the space following the question.

Whenever a numerical value of g is required, take $g = 9.8 \text{ m s}^{-2}$.

When a calculator is used, the answer should be given to an appropriate degree of accuracy.

Information for Candidates

A booklet 'Mathematical Formulae and Statistical Tables' is provided.

Full marks may be obtained for answers to ALL questions.

The marks for individual questions and the parts of questions are shown in round brackets: e.g. (2).

There are 8 questions in this question paper. The total mark for this paper is 75.

There are 28 pages in this question paper. Any blank pages are indicated.

Advice to Candidates

You must ensure that your answers to parts of questions are clearly labelled.

You should show sufficient working to make your methods clear to the Examiner.

Answers without working may not gain full credit.

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1. A particle P is moving with constant velocity $(-3\mathbf{i} + 2\mathbf{j}) \text{ m s}^{-1}$. At time $t = 6 \text{ s}$ P is at the point with position vector $(-4\mathbf{i} - 7\mathbf{j}) \text{ m}$. Find the distance of P from the origin at time $t = 2 \text{ s}$.

[illegible]

(4)

(3)

This image shows a full page of white paper with horizontal blue or grey ruling lines, typical of notebook paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

4. A beam AB has length 6 m and weight 200 N. The beam rests in a horizontal position on two supports at the points C and D , where $AC = 1$ m and $DB = 1$ m. Two children, Sophie and Tom, each of weight 500 N, stand on the beam with Sophie standing twice as far from the end B as Tom. The beam remains horizontal and in equilibrium and the magnitude of the reaction at D is three times the magnitude of the reaction at C . By modelling the beam as a uniform rod and the two children as particles, find how far Tom is standing from the end B .

(7)



- (4)

- (8)**

[illegible]

Question 5 continued

[illegible]

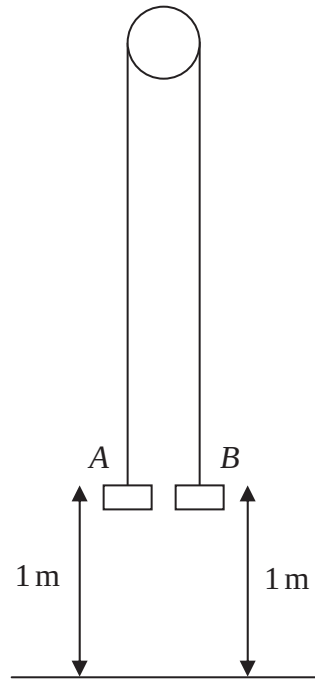
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- This image shows a full page of blank, lined paper. It features approximately 20 evenly spaced horizontal grey lines across its entire width, providing a guide for handwriting or typing. The paper itself is a clean, off-white color.

Leave
blank**Question 6 continued**

Question 7 continued

[illegible]

8.

**Figure 3**

Two particles A and B have mass 0.4 kg and 0.3 kg respectively. The particles are attached to the ends of a light inextensible string. The string passes over a small smooth pulley which is fixed above a horizontal floor. Both particles are held, with the string taut, at a height of 1 m above the floor, as shown in Figure 3. The particles are released from rest and in the subsequent motion B does not reach the pulley.

(a) Find the tension in the string immediately after the particles are released. (6)

(b) Find the acceleration of A immediately after the particles are released. (2)

When the particles have been moving for 0.5 s , the string breaks.

(c) Find the further time that elapses until B hits the floor. (9)



Leave
blank**Question 8 continued****Q8****(Total 17 marks)****TOTAL FOR PAPER: 75 MARKS****END**